UNITED STATES
DEPARTMENT OF THE INTERIOR

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K.M. Waggoner 1955 — Notebook #3

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Inyan Kara study

Crook Co

Partial section base Skull Cr. or top Hill River. Devils Tower 1 SE Quad

Locality W-1 - Stream cuts W. of gate (3rd) on rd to Goat Canyon, 1 mile north turnoff from County Rd to Algada. Cent. W½ SW¼, sec 7, T.56N, R.64W (64)

Measured up from a rusty [illegible]

[illegible]

0.8 [illegible]

1.5 [illegible]

2.0 [illegible]

12.0 [illegible]

0.7 [illegible] brown.

10.0+ [illegible]

Locality W-2. [illegible] from top of Fall River to base of [illegible] unit in preceding section [illegible] Loc. W-1, 9.6 of [illegible] [illegible] is at [illegible] [illegible]

Shale here rests on interbed. [illegible] to interbedded [illegible] shale.

Up slope beyond [illegible] is [illegible] [illegible] zone, locality [illegible] (see [illegible] #1 in Sec. p. 25)

Locality is about 1¼ miles N. of W-1 along same road. Local badlands in Skull Creek visible across gulch in top Fall River on W side road.
Devils Tower 1 SE Quad., cent., W ¼ SW¼, Sec. 6, T56N, R.64W, and due west into ~~R~~ Sec. 1, R65W.

Government Canyon section.

Part 1. From base cylte ss down into red claystones

Base cylte ss

3.4 Claystone, light [illegible] green bentonitic in upper foot, [illegible] claystone to light gray-green claystone with red mottling.

9.0 Claystone, hard red, becoming silty, [illegible]. Hue ranges from chocolate or brick red to dark red.

20.0 Claystone, silty, red, grading to clayey siltstone, purplish red below. Located at top are lenticular beds of white porcellanite up to 1.0 foot diameter. Beds 4" [illegible], [illegible] and stained [illegible]. Some porcellanite [illegible]

scattered in lower part

1.0+ Claystone, [illegible] green.

On up gully toward cliffs, [illegible] changes take place in color [illegible] this part of section, becoming [illegible] upper greenish cast. As [illegible] outcrops [illegible] towards the cliffs.

Part 2. Access up from base of [illegible] locality of Part 1.

16.0± Siltstone clayey sandstone and some claystone. Chiefly soft fragments weathering to white slopes. Beds 1.5 locally crossbedded to conglomeratic stringers, weathers brown, [illegible] ten and slabs, leaving other incorrectly [illegible] with [illegible]. About 4' from top are thin [illegible] sandstone locally [illegible] bedded chert, in thin layers. Top of sand gradational into sandy claystone above, which is mottled green with some yellow stains.

Thruout this interval polished chert pebbles weathering out. From 1/2" up to 6" long [illegible]. Tend to occur in numbers locally than sparse. Seen in place in both crystals and [illegible]

[illegible] on [illegible] crust

16.0 [illegible] gray [illegible] some carb [illegible]. Some F spl [illegible]

7.0 Crystal [illegible] prob [illegible] gray. Some F [illegible] pebbles

7.0± Silty clay, [illegible] outstored.

[illegible] Carbonaceous clay [illegible]

Part 3. Start [illegible] red [illegible] bed at min. zero, at bottom [illegible]

15.0-? Siltstone, loc [illegible], variegated purple and green. [illegible] Some [illegible] recognized [illegible] 9 [illegible]

Upper 2± feet hard silty
clay, med and gray.

9.5 Claystone green, some gray
mottling in lower part.
Becomes [illegible] about 2.5
[illegible]
Becomes lighter & silty at
top and green [illegible] Sandy
claystone [illegible]

3.0 Claystone sandy, [illegible]
gray to green, wh tr with
green [illegible] coal [illegible].

3.4 Sandstone, fine, clay
fragments, [illegible] yellow-
weathering, hard layer.
about 1 foot [illegible]
[illegible] layers.
layers of coal.
[illegible]
[illegible] no pollen
chert pebbles.

2.2 Claystone, sandy, [illegible]
clay [illegible], gray
[illegible]
[illegible]

poi[illegible] pebbles have [illegible]
seen in place in immediate
vicinity

6.0± Clay [illegible] dark gray.
Lower 2'[illegible] light [illegible]
[illegible] [illegible]
[illegible] [illegible] stain.
Placed [illegible] under crust
no [illegible] [illegible]
locally [illegible] [illegible]
[illegible], forms [illegible]
[illegible] [illegible] [illegible]
unit.

10.6 [illegible] gray [illegible]
[illegible], lumpy crust on
slope. [illegible]
shale. Scattered [illegible]

5.0 Clay [illegible], touch [illegible]
gray [illegible]
light gray [illegible].
[illegible] [illegible]
[illegible] by change from
[illegible], clay to soft shale.
[illegible] 3.ft [illegible], [illegible]
[illegible]

0.5 Siltstone, locally [illegible] lenses, weathers with green crust, has local Fe brown stained [illegible].

2.4 Claystone, tough, light gray, with greenish [illegible]

3.5 Shale, dk gray to black locally carb. [illegible] platy.

5.5 [illegible]

1.4 [illegible]

3.[illegible] [illegible]

[illegible]

0,6 [illegible]

[illegible]

2,4 [illegible]

3,0 [illegible]

1.0+

4.4

1.3

0.2+ Sandy [illegible], fine grained [illegible] bluish gray, [illegible] freq. [illegible] less [illegible]. Below 1 to 2' breaks to intermixed gray clay & silt [illegible], carb. freq.

1.4 Silt, gray [illegible] [illegible] prev. [illegible] sample [illegible]

0.3 [illegible] Fe [illegible], hard,

4.6 Silt [illegible] [illegible] Fe [illegible] Fe [illegible] 1.1 [illegible] and [illegible] [illegible] [illegible] [illegible] gray [illegible] [illegible] clay.

1.6 Interbedded fine gr. s. + silt [illegible] with Fe impreg. layers 0.1 to 0.3 thick, 2 of [illegible] locally prominent.

This section continued on p. 13

Locality No. 1, east side of road in [illegible]. Exposure of shell [illegible] F.R. [illegible].

Measuring [illegible]
[illegible] roots.

S.7 [illegible]

4.0 [illegible]

1.0 [illegible]

gradation to clayey silts

0.4 [illegible] of Fe stained, [illegible] with red [illegible] [illegible]. [illegible]

4.2 [illegible] [illegible] 13[illegible] [illegible] [illegible] looks like [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] upper 2.0' [illegible] [illegible] to [illegible] [illegible]. This [illegible] [illegible] SS, and [illegible] [illegible] concentration [illegible] [illegible] [illegible] of medium fine gr SS. [illegible] gray [illegible] sr. [illegible]. This [illegible] [illegible] [illegible] [illegible] with upper.

[illegible]
merge with [illegible]

4.0-? [illegible]

[illegible]

Gov't Canyon section cont from p. 12

1.1 [illegible]

7.0 [illegible]

6.1 [illegible]

2.8 [illegible]

0.6 [illegible]

1.8 [illegible]

1.0 [illegible]

0.5 [illegible]

2.4 [illegible]

[illegible] with [illegible] intercalated clay
Sil[illegible] [illegible]
10 [illegible] [illegible]
Conc. [illegible] 0.1 [illegible]
1.0 from top. [illegible]
[illegible]
[illegible]

3.6 [illegible]
[illegible]
1.5 [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

1.1 [illegible]
[illegible]
[illegible]

0.4 0.[illegible] [illegible]
[illegible]-lam. [illegible].

0.5 Shale [illegible], qtz [illegible] 0.33 [illegible]
[illegible]

thin yellowish [illegible]

0.8 Siltstone, gray, sandy, shaly to massive locally, carb. flecks. Weathers gray white to light gray

2.0 Sandstone, fine gr, silty, irregularly bedded, friable, light buff weathers, locally clayey. Has Fe staining [illegible] yellow [illegible] brown, [illegible] crumbly, [illegible] "worm-eaten" [illegible] [illegible] oolites.

2.5 Sandstone, fine gr, massive, [illegible] 0.9 Fe [illegible] Fe brown [illegible] gray

4.5 Sandstone, fine-gr, [illegible] med gr. [illegible] bed. J. [illegible] Sandstone [illegible] upper part

0.9 Interbedded [illegible] sandstone, dk gray [illegible] [illegible]

1.3 Sandstone, f. gr., ~~[illegible]~~ [illegible] bed[illegible] breaks to [illegible] by jointing. Weathers yellow gray. [illegible] locally. Some [illegible] is [illegible] plant [illegible] fragment, [illegible] laminated.

2.1 Sandstone, fine, lt. and gr [illegible] Thin bedded with upper 0.5 [illegible], [illegible]. Lower 0.5 [illegible] + bed [illegible] plant [illegible]. Similar to unit [illegible] [illegible]. [illegible] lat. variation in scale [illegible] wave markings in [illegible] places.

5.7 [illegible] sh, [illegible] silty sh, & [illegible] silty layers. Hard, weathers to [illegible] gray [illegible] [illegible] Sh. part [illegible] dk gray [illegible] [illegible] gray [illegible] [illegible] 5 [illegible] [illegible] [illegible] [illegible]

Lunar Rock Study

Locally more shaly in middle part. On clay free this interval commonly weathers with [illegible] total common stratigraphy

(#3) 10.6 Sandstone, fine-to medium-gr. in thin beds, some massive some cavernous [illegible] meters. Silty zones [illegible] many friable [illegible] zones result in shaly weath. Has 3 or 4 [illegible] [illegible] 1' [illegible] 2nd, beds in basal 1.5 to 2.0 Fe impregnated. [illegible] full of [illegible] ripples. Upper 1.1 f [illegible] or [illegible] white, [illegible] in [illegible] top layers. Top [illegible] Fe or [illegible]

1.0 Siltstone, gray, clayey [illegible] Crack free. Locally shaly sh.

2.2 Interbedded clayey siltstone & silty clay, gray and [illegible] to pink, and sandstone. Latter in [illegible] beds, 0.3 [illegible], [illegible] at base. Ss is [illegible], [illegible]. A few [illegible]

This interval completed top p.22 by mistake →

(Hu)	15.0	Sand [illegible] to medium grained, upper 7 to 10'± is medium x-lam, weathers to [illegible] medium brown + 0.[illegible] [illegible] Lower 3-5'± [illegible] to thin bedded in beds 0.5 to 2.0 [illegible], with some shaly SS. plates. [illegible]
	3.1	Shale, carbonaceous, [illegible] in upper foot grading to slightly carb [illegible] with sand silt. Basal 0.7 is gray [illegible] clay [illegible]
	0.7	Shaly, light gray silty with thin [illegible] lam. [illegible] at top. [illegible] has [illegible]
	2.7	[illegible] to light-[illegible] gray [illegible] medium silty [illegible]

This belongs bottom of page 20.

[illegible] vertical fe impregn silts [illegible]. Vuc [illegible] Inter of charcoal [illegible] with a light gray [illegible] 5 ft.

3.4. Interbedded gray [illegible] Sandstone. Lenticular [illegible] thin beds + [illegible] interbed with shale.

0.6 Lenses of sandstone [illegible] weathered purple brown [illegible].

0.[illegible] Sandstone, [illegible] grained to [illegible] with interbeds gray shale.

5.0 Shale gray [illegible], weathers [illegible] with [illegible] siltstone. Upper 2.0 [illegible] silty [illegible] gray silts [illegible] interbeds.

5 to 12 ft (locally 12 ft.) Sandstone [illegible] locally [illegible] with [illegible] beds.

on but set go. with odd [illegible]
[illegible] in direction [illegible]
ss. at 2' from said top, I [illegible]
2' intervals [illegible]
[illegible] Also [illegible] for 3'
was got [illegible] out [illegible]
interbraced so [illegible]

Locality W-4. [illegible]

[illegible]

[illegible]

[

Locality W-2

Continuous section of Stoll Creek up from the base of the bentonite. [illegible]

1.6 Bentonite

1.8 Shale, [illegible]

1.0 Sh[illegible]

(Sample #1 →) [illegible]

At top is silt[illegible]

9.0± Shale, clayey, dark gray to black
weathers light gray at base,
brownish gray above. Becomes
silty in upper 2 [illegible] and
upper 0.6± is Fe stained siltstone
and sandy siltstone [illegible].
Interval includes scattered siderite
concretions, some [illegible].
Out [illegible] [illegible] 1.0± [illegible]
[illegible] [illegible] has [illegible]
[illegible] and [illegible] [illegible],
(Sample-2)
Above [illegible] some [illegible] [illegible]
[illegible] shale (Sample-3), horizon not
clearly seen but float from
[illegible] [illegible].

13.8± [illegible]
[illegible]
At depths 0.3 to 0.5
Fe-stained siltstone which
caps [illegible]. At 0
just [illegible] [illegible]
[illegible], blue [illegible]
[illegible] [illegible]
beds. Some [illegible] sandy
concretions [illegible] float
of lower part this
unit.

Is [illegible] [illegible]
[illegible] the [illegible]
[illegible] black
shale, clay [illegible]
[illegible]
[illegible]

11.6 Shelly deck [illegible] to black [illegible]
[illegible] silty [illegible]
[illegible] at [illegible]
[illegible] in lower [illegible]
[illegible] begins [illegible]
weathered [illegible] & [illegible]
At top is [illegible] silt, [illegible]
coarse [illegible] layer, 0.2-0.5
[illegible] at the [illegible]

4.5 [illegible], [illegible]
[illegible]
Fossil [illegible] Sidewall
at top 2.4±

11.4 [illegible] up slope to silty [illegible]
[illegible]. In [illegible] bed [illegible]
[illegible] below
[illegible] 4 [illegible] top

6.5± Shale [illegible], [illegible]
[illegible] rock, [illegible]
[illegible] but within 2'.
In [illegible] [illegible]
[illegible], [illegible]
[illegible] to [illegible]
[illegible] [illegible]
[illegible]

W-2. [illegible]

[illegible]

Sketch [illegible]

5.0 [illegible]

0.0 [illegible]

2.0 [illegible]

0.1-0. [illegible]

3.0 [illegible]

[illegible] buff, [illegible]
[illegible]
[illegible]

In most [illegible]
[illegible]
13 [illegible]
bur[illegible], [illegible]
and gulley [illegible]
[illegible]

Resumé Gov't Canyon area.

Skull Cr. – Basal part has bentonite which may turn out to be good marker. Local abundance fish + reptile bones may not be typical over large area, but similar bones in Carlile quad — + Hot Springs S.D. (see spec.) also the plesiosaurs from N. Colo in this approx position.

Fall River – Locally much sandier than in most other parts of area, more evidence of burrowing organisms. The upper "variegated" zone doesn't seem to be evident here, nor ~~the~~ is shaly zone common above basal ss on Inyankara Cr. present.

Lakota. Believe only part of it is exposed + that red claystones basal part section are Lakota. Set up like that on Robinson-Theobald sect. Inyan Kara Cr. with uppermost ss coming in, but here some gray clst between it + Fall R. contact.

Should get more info on cross cutting of massive ss near top Fall Riv.

[see iP repr.
287 Eichen Bull sec. 37]

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Locality W 5

[illegible]

[illegible]

Nemesi [illegible]

3.0 [illegible]

4.3 [illegible]

4.5 [illegible]

[illegible] [illegible]

[illegible] gray [illegible]

3.6 [illegible]

9.5 Clayey [illegible]

7.1 [illegible]

Upper pelle zone

[illegible] ness with sun-ptas [illegible] Bed 1' is [illegible] of [illegible] pellets. (S[illegible] pt 11)

12.± Shale, [illegible]

5.[illegible] [illegible] with [illegible] small [illegible] cond, [illegible] overlie C[illegible] [illegible] ?[illegible] (Cl[illegible])

2.4 Shale, [illegible] At [illegible] cond [illegible] of [illegible] Fe [illegible] pellet [illegible] which is sparingly fossiliferous. (Lower zone: Sample 2A, [illegible] Sample 2B)

9.5 Shale, [illegible], with [illegible] [illegible] Fr[illegible]. Fe[illegible]

A825

[illegible] Other [illegible]
case [illegible] on location [illegible]
from [illegible] another about
4.0' [illegible]
[illegible] 3 - upper 3'
[illegible] lower 6'

4.3. [illegible]
[illegible] 2' [illegible]
[illegible] CB
[illegible]
[illegible]
(see [illegible])

7.3 [illegible]
[illegible]
[illegible]
(see [illegible])

8.3 [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

4.8 [illegible]

[illegible]

6.7 [illegible] 2.7

conc. [illegible]

0.[illegible] [illegible]

1.2 [illegible]

5.6 [illegible] calc. conc.

4.9 [illegible]

3.5 [illegible]

Loc. W 6

[illegible]

[illegible]

51. [illegible]

[illegible] but [illegible]

[illegible] approx 1 [illegible]

[illegible] Fe [illegible] ± X [illegible]

[illegible] hollow [illegible]

[illegible] about ½ layer ±

F. [illegible] Pebble found in it

but only one seen.

4.7 [illegible] lightly peppered with [illegible] incus spots. Soft forms white clayey [illegible] on [illegible] Sandstone [illegible]

2.7 [illegible] silty. Upper [illegible] to [illegible] is local [illegible] streaks [illegible] [illegible]

3.2 Sandstone [illegible] may [illegible] [illegible] [illegible] spots.

96.0 Sandstone, [illegible] 51 [illegible] [illegible] [illegible] [illegible] gr. [illegible] 31± [illegible] gr. At [illegible] 13 [illegible] [illegible] [illegible] [illegible]

5.0 [illegible]

3.0 [illegible]

6.5 [illegible] dk. gray [illegible]

5.5 [illegible]

22.0 [illegible] over 1 foot, [illegible] 0 [illegible] 30 [illegible] not over cavo.

7.0 [illegible] dk gray to black [illegible] slly

[illegible] fragment [illegible] fragments [illegible] study at [illegible].

6.4 [illegible], [illegible] edge, [illegible], [illegible] throughout [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

4.2 Cl[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

1.2 [illegible]

6.0 [illegible]

10.6 [illegible]

2.6 Sa[illegible], med[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] intervals.

[illegible] fricative, [illegible]
[illegible] 2

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0.[illegible] Liquid [illegible]
[illegible]
(sample 1)

4.6 [illegible]

4.9 [illegible]

11.0 [illegible]
Sample 1 [illegible]
[illegible] 10 unit [illegible]
[illegible]

3.7 [illegible]

[illegible]

2 – [illegible]

[illegible]

2 – ? [illegible]

W-7

Old [illegible] mine [illegible] just ½ mile E
Aladdin, Just N. of Wyo Rt 111 in
center N½, SE¼, sec. 28 T54N, R61W

[illegible]

Part A

33.5 [illegible] x-[illegible], weathers [illegible] to
[illegible] with pinkish crst,
[illegible] set to friable. Beszl[illegible]
60± [illegible] crsts [illegible]
[illegible] Fe [illegible] over [illegible]
[illegible] [illegible]

0.5 to 2.5± Conglomerate zone. [illegible]
[illegible] poorly [illegible]
[illegible] of [illegible], [illegible],
[illegible], [illegible], [illegible]
[illegible], [illegible] granule
and pished pebbles. Evidence
of [illegible] plant matter, [illegible]
[illegible] [illegible] [illegible]
[illegible] conc. [illegible] [illegible]
[illegible] to [illegible] ss.
[illegible]

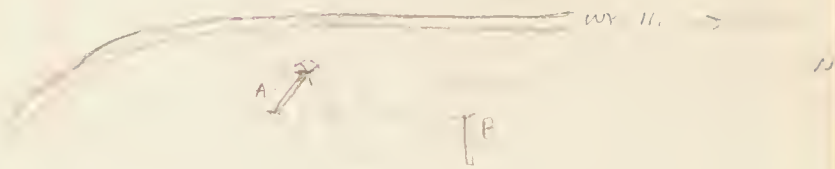
Comment at top.

13.0 Semi-[illegible] med. gr. [illegible] cross laminated with lag [illegible] 1 [illegible] (dark [illegible]) [illegible] argillite and [illegible] local zones with [illegible] ss [illegible]; lenses [illegible] [illegible] [illegible] upper surface [illegible] [illegible] [illegible].

2.5+ [illegible] [illegible] [illegible] locally a grey white stony sandy silt.

5.2+ Sandstone, medium [illegible], med. gr. [illegible] thickness zoning [illegible] highly [illegible], weathers buff to orange and pinkish stain.

5.3+ Soft zone varying in thickness with [illegible] of ss. [illegible] of [illegible] Is [illegible] but spot sampling shows [illegible] [illegible] ss with [illegible] [illegible] ss. Weathers to west of white, pink and [illegible].


A
B

15.0' Sandstone, massive, brown-black, medium grained, x-bedded, some plant fragments in basal part.

Part B To west along crop of 15.0' ss above, to next high point in ridge.

Starting at base of 15' ss above.

14.0 Sandstone, massive, x-bedded, med gr., weathers buff to brown, some pebbles [illegible] iron + [illegible] in basal part.

20.0 Sandstone, thin bedded (x-bedded) [illegible] weathers light gray to gray [illegible] Fine grained [illegible] at [illegible] Local [illegible] Thin bedded 5'

21.0 Sandstone med gr. weathers brown to tan-buff, x-bedded. Lighter gray zones have locally [illegible]. Channels [illegible] with massive [illegible] 10 [illegible] x-bedded

46.0 Slope [illegible] by wash and slump to [illegible] of 1st [illegible] liver type ss.

Detailed contact clay out [illegible] down [illegible] of 1st Fall River

4.6 [illegible] shale [illegible] grading to [illegible] size [illegible] [illegible]

[illegible]

0.5 [illegible] + silty [illegible] light gray [illegible]

2.0 ± ft [illegible] mottled [illegible] gray [illegible]

[illegible] up slope on Fall River [illegible] lower ss.

4.0 [illegible], tabular [illegible] fine-med, gr. buff to [illegible] [illegible] vertical [illegible] [illegible]

6.0 Covered slope

3.7 [illegible] lzw, xlzw.
[illegible]
brown

30 [illegible]

13.6 [illegible]

11.4 [illegible]
brown.

10.6 [illegible]

Part C -1.0- [illegible]
[illegible] to 20 [illegible]
[illegible]
[illegible]

Locality W-8 Nichelson Ranch

On S side of local high ridge E south of Wyo. Rt. 111 about 3/4 mi NW Aladdin, NW cor. sec. 34, T. 54 N., R. 61 W.

Measured section from within vertz, starting at top of massive [illegible] tuff [illegible] [illegible] hill.

72. [illegible] [illegible] gray to [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] with big chunks of soft [illegible] SS. - one of the [illegible] locally about [illegible] from top [illegible] [illegible] 3' [illegible] scattered cht + qtz pebbles

71. [illegible] zone, variable [illegible] containing [illegible] qr SS with chert gtl ~~[illegible]~~ granules, pellets [illegible] clstn. grades into [illegible] unit above.

Basal 2 or 3' is [illegible]
clayey ss. or fine-c
with some hard ledges
med. gr. ss. Poli[illegible] pebbles loc.

35.0 Sandstone, medium grained
well sorted, 3-2 m. upper 20'
weathers yellow grey to
dark yellow, lower 10-15'
[illegible] bedded in beds 0.5
to 2.0 with interbeds
[illegible] to sandy sh. +
sandy ss. grey to light
[illegible], some pebbles,
[illegible] except in lower
2 or 3' where [illegible]
locally 0.5'.

1.5 Silty clay, greenish grey
is dk brownish grey
with plant frags (including
coaled leaves), basal 0.5
is lignitic shale many
plant frags, weathers
purple, much [illegible] stain
[illegible] frags + [illegible].

1.0 Sandstone, clayey fine-gr
to sandy clay, plant
frags.

4.0 Sandstone, medium, massive, [illegible] fossils, broken [illegible] [illegible], [illegible] to [illegible] gray [illegible] [illegible] & local thin [illegible] [illegible] 1' from [illegible]

4.0 Shale, dk gray to dk brownish gray finely silty, weathers gray to purplish gray. [illegible] plant fragments and local thin [illegible] plant [illegible] [illegible] light shale.

2.5 Coal (lignite), and shaly lignite. Upper 1.0' [illegible] [illegible] coal soft coal, lower 1.5 [illegible] [illegible] lignite.

1.5 Shale dk brownish [illegible], weathers light gray, plant frags brownish [illegible] at base

1.8 Shale, [illegible] grading to shaly [illegible] with thin [illegible] shale. Plant frags some recognizable as ferns

5.5 Sandstone med. gr. [illegible] 1.0' very very clean [illegible] lower [illegible] with [illegible] matter, because [illegible] base.

2.5 Shale dk. gray blocky, platy, finely silty.

1.1 Coal lignitic

3.0 Claystone to black, sh. lignitic [illegible] under [illegible] than gray. [illegible] black to dk gray.

0.1 [illegible], fossiliferous gray.

1.1 Shale dk gray blocky, finely silty

2.6 Sandstone, f. to gr, some silt, soft massive, with [illegible]

1.0 Shale as above increasing lignitic at base

0.2 Lignite

2.8 Sandstone, massive fine gr. [illegible], weathers light gray some yellow & brown stain on joint faces

2.8 Shale, [illegible], dk gray loc. fissly silty

1.0 [illegible] or [illegible]

11.6 Shale, [illegible], dk gray [illegible], locally [illegible] clay [illegible] 1.5 silty [illegible] at base 1.4 0.3 [illegible] silty [illegible] weathers gray.

1.3 Shale as above

2.4 [illegible] sandy to silty [illegible], brown, becomes sandy at base

1.0 Sandstone, fine grained, massive, weathers yellowish, some lenses of lig silty shale at base. Eq. silty

2.8 Clays [illegible], green, light gray gypsum zone at base

13.0 Thick, [illegible], dk greenish gray with [illegible] green [illegible] lower beds limestone.

15.0 Clay obscured by slope wash. Pitch. green [illegible] & some limestone in float.

11.0 Sandstone, fine, gr, gray [illegible] weathering [illegible] thin bedded [illegible] with [illegible] gray [illegible] & some thin beds.

5.0-? Shale, silty ~~[illegible]~~ dk gray, with [illegible]

Water [illegible] in stream below.

W-9

Road & stream cuts along rd to Four Corners from Wyo Rt 111, chiefly in E½ NE¼ sec. 27 T.54 N., R.61 W., just N junction with Rt 111

[illegible]

[illegible] x-lamy rip [illegible]

40.0 [illegible] interest — [illegible] [illegible] to give rich [illegible] [illegible]

0.5 to 1.5 [illegible]

3.5 [illegible]

6 [illegible]

[illegible] Some [illegible] pebbles [illegible]

2.0 [illegible]

2.1 Limestone, med. gr. yellow weath. Thickens w/ at need to big chemical fill cutting out most beds below.

15 [illegible] Shale, blocky, ~~[illegible]~~ mor of [illegible] sum-pieces

2.0 light [illegible]
2.5 red [illegible]
2.0 yellow-green [illegible]
1.5 red ← mercen
7.0 gray

About 35 from base is [illegible] shale [illegible] below [illegible] [illegible] [illegible]

1.3 [illegible], [illegible], [illegible] [illegible] the upper 0.5 [illegible] is clayey silts, grading to silty sh.

5 [illegible] Gray bl. clay, plastic shale, with gyp xls [illegible] thru silty lighter gray to greenish clayey silt
(Sample 1 of upper part)

0.5, Siltstone cemented by Fe [illegible] [illegible] grain.

9.7 Shale, dk gray, clay, some silt interbeds in upper 3'. Sample 2 of upper 5'.) [illegible] cover [illegible]

7.6 Sandstone, fine gr., massive. Upper 0.[illegible] [illegible] Fe [illegible] [illegible] [illegible] [illegible]

21.0+ Interbedded dark gray [illegible] [illegible]. Shale [illegible] [illegible], [illegible] interbedded silt + sand. Sandst. in [illegible] locally [illegible] ~~[illegible]~~ [illegible] 0.[illegible] thick, [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] ?

Coniopteris brevifolia (Font.) Bell

Locally in small cut [illegible] of [illegible] [illegible] [illegible] as much as 4 feet [illegible].

Gulley comes in from east and with [illegible] [illegible] outcrop of this unit. South across gulley, top of 1.6 SS above can be located and beneath 17 18 23 feet of [illegible] [illegible] [illegible] [illegible] [illegible] at base of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] pieces of material [illegible].

From top of the SS across gulley [illegible]

21.0 [illegible] [illegible] 7 [illegible]

15.4 [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] float to [illegible] 4 feet

5.7 - [illegible] [illegible] [illegible], [illegible], silty, [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

is variable in thickness.

4.5 Claystone, dk gray, blc, silty, some gyp in fractures. (Sample 3)

1.3 Lignite, brown [illegible] reddish, of plant frags. (Sample 4)

5.3 C[illegible] dark gray, [illegible] silty + sandy in [illegible].

0.3+ Sandstone, [illegible] with plant [illegible] [illegible] into [illegible]

? Sandstone, [illegible], [illegible]

W-10 Arch Creek section. NW 1/4 SE 1/4 sec 14 T51N, R.66 W, just off rd to Moorcroft to W about 1/4 mile before it turns W over ridge.

Part-A Begins within Fall River at top of small butte 1/4 mi N of where Moorcroft rd swings W up ridge. Measuring down

10.0 [illegible] Chert [illegible] to 1.0 but [illegible] x-lam. with [illegible] Fl. [illegible] Fucoids

7.3 [illegible] shale. Chert, lam [illegible], [illegible] yellowish [illegible] Some [illegible] Cilt, [illegible] ridge.

11.3 [illegible]

silt throughout. Locally [illegible] carb foss. [illegible] worked. Some Fe [illegible] red brn weath silt layers, some carb. Fe in silty zones.

2.2 Sandstone, fine grained, thin beds up to 0.6, cross-[illegible] breaks to platy + flat [illegible] along [illegible] silty to sandy shale. [illegible] grey [illegible] locally Fe impregn. at top [illegible]

2.4 Shale grey, silty with interbeds 0.1 - 0.2 of siltstone, [illegible] commonly Fe impreg.

9.7 Shale, grey [illegible] in upper 3 ft, black, [illegible] silty beds, [illegible] Some [illegible] on bedding planes. (Sample 1 is from 2 to 5 ft above desc.

1.0± Sandstone fine gr, locally Fe [illegible] cross-[illegible], upper part [illegible]

[illegible] to peculiar time's lumpy surfaces.

5.3 Shale, dark bluish gray, [illegible] thin salt interbeds in upper 2.0' (Sample 2 is spot [illegible] wood mid. 2') [illegible]

1.5 Sandstone, fine grained, upper 0.6' [illegible] lamination clay, friable lower part [illegible] bed [illegible] weathering [illegible] breaking to [illegible] on laminations. Weathering [illegible] buff.

4.8 Shale, gray, [illegible] ~~[illegible]~~ [illegible] gray weathering [illegible] silty, carb frags loc. Upper 1.5 feet is dk gray, silty with [illegible] salt in thin beds, some Fe [illegible] in upper 2'+.

1.4 Sandstone fine grained, tan to yellow weathering buff, some Fe stain. Upper 0.7 loc. hard, lower 0.7 clayey with lib sh.

3.0 Shale, very silty in upper
1.5 gray + light gray, brown
stain. Lower [illegible] less
silty, dark gray.

2.4 Sandstone, fine-grained, + silty,
irreg. interlam with dk
gray shale, locally
just mixed with clay.
Some interbeds sandy
shale with carb frags.
Unit Fe + yellow stain,
[illegible] weathers to
rubble [illegible] poorly-
siltst. [illegible], sl
calc.

1.0-2.0 Sandstone, fine-gr, cross lam
in [illegible] 0.5, hard,
rippled, weathered. Cap rock,
[illegible] Fe bio.

3.0 Sandstone, medium
fine grained, silty, gray
lat. [illegible] to silt stone
[illegible] buff.

1.5 Siltstone, sandy [illegible]
irreg. thin bedded, some
shale laminae.

0.7 Shale, gray silty.

1.2 Sandstone, fine gr, in thin beds with shaly ptings. Friable.

0.3 Shale, black fissile

6.3 [illegible] thin bedded, [illegible] locally some [illegible] beds. [illegible] buff. [illegible] locally [illegible] by Fe about 3 feet top. [illegible] shale pinch. Forms shelving [illegible] in [illegible] topography.

4.0 Sandstone [illegible] thin [illegible] & becoming silty. Gradation interbedded + interlam. shale & siltstone 1.5 to 2.0 from top, and this into silty dk gray shale in lower foot.

Part B – Starting at base of bluff and measuring up to joint Part A.

[illegible] blue approx. 16 feet (hardness) above top of basal [illegible] (Part C), [illegible] wash.

18.2 Crystal sandy [illegible] with [illegible] green [illegible] sandstone.

[illegible] sandy, [illegible] of 8 [illegible]

Lower 3 [illegible] wash, is vivid green to green [illegible] yellow [illegible] – capped locally by dk green [illegible] to siltstone, conglomerate etc.

About [illegible] cgl. [illegible] gray [illegible], sandy. [illegible] sandy green clay cgl extends upward 5 [illegible] is succeeded by [illegible] 3 yellowish gray sandy [illegible] [illegible] this upper [illegible] line [illegible]

of some types.

0.3 - 0.4 Zone of coarse sandy clay, pebbles more abundant. A number of pieces large pebbles found in place here. Color 3, is yellow stained with some light gray [illegible]. Seems to be [illegible]. On unit above [illegible] that below

7.5 Clay here, sandy, is redder at base, with calcareous [illegible], and the upper 2 feet, but mixed pretty [illegible] [illegible] light gray [illegible]

3.0 [illegible] soil [illegible], [illegible] of [illegible], [illegible] clay and [illegible] silt and scattered coarse [illegible] [illegible] gray white

Sample very hard [illegible] in this zone [illegible]

	8.0	Sandstone, fine to [illegible] with [illegible] granules.
Locally [illegible]		At base is thin [illegible] calcite layer resting unconf on surface of unit [illegible]
[illegible]		[illegible] with [illegible] sand with some clay [illegible]
Cal layer		[illegible]
Sample [illegible] from upper part this [illegible]		[illegible] in [illegible]
	2.3	Claystone, [illegible] with some [illegible] sand [illegible]
	1.0+	Claystone, dk gray [illegible] (bottom of sample 3)
	4.0	Siltstone, [illegible] weathers light gray, [illegible] [illegible] silty clay [illegible] [illegible] above. [illegible] with [illegible] clast granules [illegible] (Top of Sample 3 is bezel foot)

5.3 Claystone, hard, dk gray silty, locally an argillaceous silt, has scattered coarse grains [illegible] + blackish [illegible] + possibly little pebbles of [illegible] locally.

2.6 Claystone, gray to light gray soft

1.2 Siltstone, hard light greenish gray, clayey, and silty claystone

4.5 Claystone, gray to dk gray to lower 2.5', black, [illegible] upper 2.5.

5.3 Sandstone light gray, weathers [illegible] to olive gray.

3.6 Sandstone, fine gray [illegible] bedded, v-fine, micaceous. In thin beds interbedded with light gray shale. Some [illegible] trails on bedding, weathers light gray or yellow gray.

Sample 7 of upper 2 ft.	5.3	Claystone and shale, about 1.5 soft waxy, possibly bentonitic shale at base. Light grayish green. Grades upward to blocky shale, locally claystone, gray with greenish cast.
	4.9	Claystone, soft below, hard upward. Gradational above & below, brecciated [illegible] color changes. Mottled [illegible] dark red brown & green [illegible] 2 ft. [illegible]
Sample 6 of center red zone		
Sample 5 of upper 2 ft.		brown & red. [illegible] pale mottled, red purple & green with the red [illegible]
	3.8	Claystone, gray, hard below gradating upward into soft waxy claystone (Sample 4 of upper 2')
★ →	3.5	Siltstone, clayey, and silty claystone, hard. In sharp contact with underlying unit. Dk gray to black

with ~~[illegible]~~ plant fragments

6.0 Siltstone, hard, grey, plant fragments, interlam, ~~very~~ & intra. beds with clay & siltstone int. dk grey, silty, slow ~~[illegible]~~ unit. Locally forms crumbly ledges, grey with yellow grey banding. siltst. shale int. up to 0.7, fissile above wheel, below.

Joins [illegible] last unit measured of part A.

Part C - [illegible] outcrop down lower slope. Part B begins 10' below top this [illegible]

10.0 Sandstone, massive, fine-med gr. -x lam, [illegible] [illegible]

23.5 Clystone, varicolored, [illegible]

About 10-13' from base is variegated red + green streak. Basal 10' completely obscured. ~~[illegible]~~

18.0 Sandstone, [illegible] & gray, [illegible] [illegible] cement, [illegible] pebbles. Some large [illegible] [illegible] pebbles, [illegible] [illegible] polished.

Part D. Outcrops across Fall River [illegible] quarry IV on [illegible] road

Laterally [illegible] [illegible] [illegible] SS, locally [illegible] [illegible] in lower part, [illegible] in [illegible] [illegible] place [illegible] SS capping butte (further [illegible] in part A.) [illegible] varies, [illegible] is 25 ±

Upper S[illegible] [illegible] about 6' ± to top of lignitic shale [illegible] Stream [illegible] [illegible] 38 [illegible] 7c

complete [illegible] section

In ditch cut in upper [illegible] Fell River - Sku [illegible] cou[illegible]. Above ½' beneath in Shell Creek 19.8 [illegible] ft. S.C. is removed in little [illegible] including some [illegible] in cones. Locally.

Top of [illegible] is [illegible] [illegible] section of [illegible] and [illegible] [illegible] [illegible].

E [illegible] is [illegible] [illegible] with [illegible] 32' [illegible] [illegible] 1.5 - 2.5 [illegible] [illegible] [illegible] 27 [illegible] [illegible]

W-11

Pieced outcrops along NW ridge in NE cor SE 1/4 sec 25 T52N, R66W, about 1/2 mi N.E. Arch Cr - Inyan Kara Cr roads junction.

Part A

[illegible]

110 Shale, gray, [illegible]

[illegible] Limestone [illegible]

75.0+ [illegible]

35.0+ [illegible]

10.0+ [illegible]

size gray chert (not [illegible]) as well as chunks [illegible]

16.0 [illegible] silt, [illegible] black [illegible] gravel [illegible]

6.0 [illegible]

25.5 [illegible] slump basal 15.0 ft [illegible] [illegible] increase, [illegible] [illegible] [illegible] [illegible]

14.0 [illegible] gravels [illegible] chert, upper 1.0 0.6 ± [illegible] [illegible] [illegible] [illegible] gravel [illegible] [illegible] [illegible]

2.5 [illegible] area [illegible] gravel [illegible]

6.8 [illegible] chert [illegible] [illegible]

Part B ([illegible] Neck [illegible])

18.0 [illegible] Impression [illegible] plant stress, [illegible] F to 0 [illegible] red. [illegible]

Part C ([illegible])

21.2 [illegible]

(height) [illegible]

(whole group) 2.0 [illegible]

(individual) 5.0 [illegible]

↓ cont on reverse (over)

4.5

Inyan Kara Creek section measured by R[illegible] + [illegible] (W-12)

20	[illegible]
3	[illegible]
1	[illegible]
2.5	[illegible]
3	[illegible]
[illegible]	[illegible]
11	[illegible]
[illegible]	[illegible]
7	[illegible]
42	[illegible]
29	[illegible]
21	[illegible]
[illegible]	[illegible]

Mac — 246

Mathew — 219

Gov't [illegible] — [illegible] — [illegible]

[illegible] 131 1

[illegible] 88 177

[illegible] 163 —

[illegible] 197 — 163 — [illegible]

JK #1 133 —

JK #2 84 —

[illegible] 107 - 147

[illegible]

[illegible]

7.5

[illegible]

15.2

[illegible]

[illegible]

72.0

[illegible]

147.0

7.4

7.7

12.0

[illegible]

25.2

[illegible]

[illegible]

[illegible]